

Trend Study 14-23-99

Study site name: South Plain .

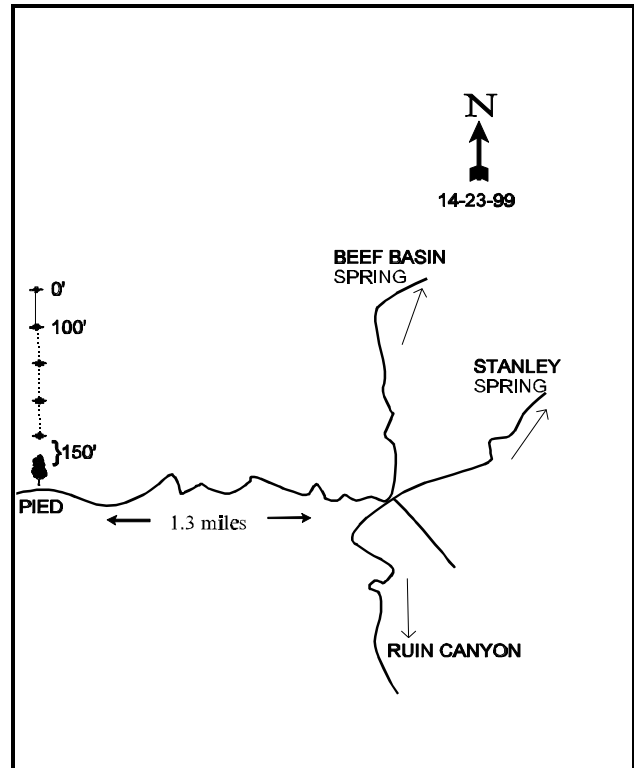
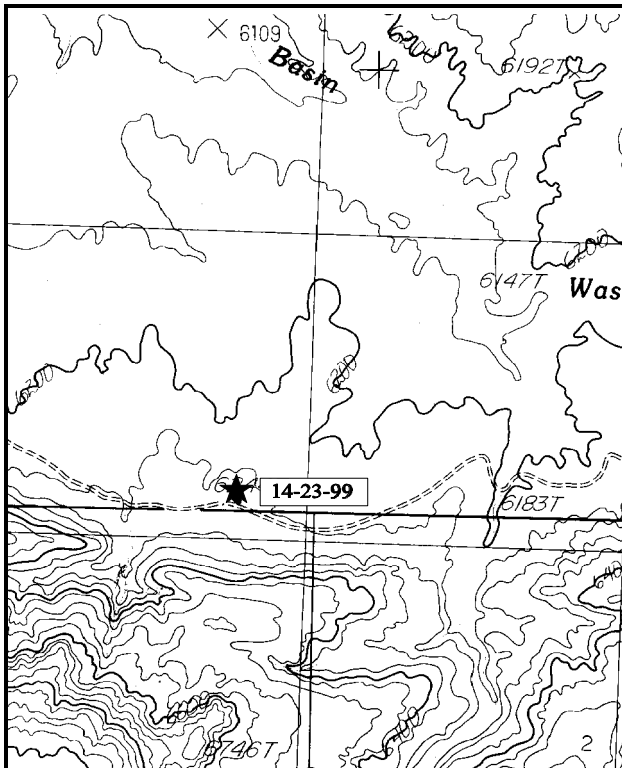
Range type: Big Sagebrush-Grass .

Compass bearing: frequency baseline 165°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft).

LOCATION DESCRIPTION

At the junction of the Elk Ridge-Salt Creek Mesa-Beef Basin Roads, go north down into the Beef Basin area. Follow the main road for 6.4 miles, passing the FS/BLM boundary down to an intersection where there is a BLM register box. Stay left on County Road #104 and proceed 1.45 miles to the turnoff to an exclosure. Stay left for 0.45 miles to a fork. Stay right again and go 0.4 miles to a fork. Go right at the intersection with the Beef Basin Canyon Road and go 0.8 miles to a 5-way intersection. Take west fork straight through the intersection (left fork goes to Indian ruins) and continue 1.3 miles to a large pinyon pine on the right. Stop here. The 500-stake of the transect starts 150 feet north of the pinyon.



Map Name: Warren Canyon

Diagrammatic Sketch

Township 32S , Range 18E , Section 34

UTM 4200279.614 N, 594761.637 E

DISCUSSION

Trend Study No. 14-23 (36-11)

The South Plain study is located in the southern part of Beef Basin, in an area known as South Plain. This study was set up to monitor the condition and trend of Wyoming big sagebrush on critical, heavily used winter range. The gently rolling plain is dominated by an old stand of Wyoming big sagebrush with openings of dense blue gramma sod. The whole flat is surrounded by pinyon-juniper covered hills and slickrock. There is very little cover over two feet in height out in the flat. Drainage of the open flat is to the west through Beef Basin Wash in the low center of the flat. The elevation of the site is 6,300 feet with drainage and aspect basically to the north.

Besides heavy winter-spring use by deer, Beef Basin also receives heavy grazing pressure from cattle. The BLM permits 450 cattle in December and 250 cattle January to June 15. There are plans for additional water developments to help distribute livestock use to the north part of the basin. A pellet group trend transect in the area shows years of continuous high use. The 5-year average was 110 deer days use/acre (274 ddu/ha) from 1982-1986 (Jense et al. 1986) which was coincidentally during the exceptionally high precipitation years. The 5-year average between 1987 and 1992 went down to 70 deer days use/acre (173 ddu/ha) (Jense et al. 1992) which is second only to Deer Flat in deer use on the Elk Ridge unit. Deer days use averaged 83 per acre (205 ddu/ha) between 1993 and 1996. Pellet group data taken along the study site baseline in 1999 estimate 76 deer days use/acre (188 ddu/ha) and 13 cow days use/acre (32 cdu/ha). Most of the cattle pats were old, but about 10% were from this spring. Nearly all of the deer pellet groups were from winter.

The soil is a light red, sandy loam with a slightly alkaline pH (7.6). Effective rooting depth is estimated at nearly 20 inches with no rooting restrictions noted. There is a one inch thick compacted layer about 3 inches below the surface, but past this the soil appears uniform. Phosphorus and potassium are low at 5.3 and 67.2 ppm respectively. Values less than 10 ppm for phosphorus and 70 ppm for potassium may limit normal plant growth and development. Due to the sandy nature of the soil, average soil temperature is high at nearly 71°F at an average depth of about 17 inches. High soil temperatures give winter annuals like cheatgrass a competitive advantage over perennial grasses, especially during dry years (especially summers). Alkali deposits are present in the creek nearby, but none were found on the study site. Litter and soil are building under plants. However, most of the plant interspaces were completely bare of cover in 1986. The soil was loose and easily moved by wind or water. Gullies are common, but the severity of erosion is limited by the gentle slope.

A moderately dense stand of Wyoming big sagebrush dominated the area in 1986 with a population density of 3,000 plants/acre. However, the stand was overly mature, heavily hedged and in poor vigor. Density increased slightly in 1992, but the change is mostly due to the much larger sample size beginning that year. Use was still heavy, vigor poor on most plants, and percent decadence increased from 47% to 81%. By 1999, the population has declined to only 1,160 plants/acre. Use is similar to 1992, vigor is poor on 52% of the sagebrush sampled, and percent decadence has increased to 91%. In addition, almost 50% of the decadent plants sampled were classified as dying. Recruitment is poor with few seedlings and young plants present. There is relatively good leader growth on sagebrush, but seed production is non-existent. The livestock enclosure in Beef Basin is a dramatic example of overuse and subsequent decline of sagebrush compared to a protected stand.

Another preferred browse species on the study site is winterfat. Selected by both cattle and deer, most of these small shrubs show heavy hedging, but still maintain moderate vigor. The population has shown a steady decline in density since 1986 combined with heavy use. Narrowleaf low rabbitbrush is common. It has shown moderate to heavy use on some plants. This species of rabbitbrush is usually rarely utilized. There are also a few scattered pinyon pine and Juniper throughout the site and into the flat.

Grasses are an important part of the community, providing more than twice as much ground cover as the shrubs. The most abundant species in 1986 and 1992 was blue gramma, a warm season grass that cures to palatable winter forage but often escapes grazing because of its low growth habit and dormancy from November through June when livestock are present. Annual cheatgrass occurred in small numbers in 1992 and increased exponentially by 1999. Quadrat frequency increased from 11% in 1992 to 97% by 1999. Cheatgrass currently ('99) provides 88% of the grass cover, 87% of the total herbaceous cover and 68% of the total vegetation cover on the site. Other grasses that provide some spring grazing are needle-and-thread, bottlebrush squirreltail, sand dropseed, and Indian ricegrass. The cool season grasses receive excessive use in the fall and spring when they tend to green-up causing a loss of most of the grasses. Consequently, cattle have put a great deal of pressure on the Wyoming big sagebrush with the prolonged drought since 1985. Perennial forbs are relatively scarce and provide little forage. Dusty penstemon shows signs of light utilization.

1986 APPARENT TREND ASSESSMENT

Based on excessive use, poor form and vigor, and low reproduction of the key species, Wyoming big sagebrush, the apparent range trend is downward. It appeared that a reduction in use would be the best management approach. This was tried by the DWR with post season antlerless permits issued to reduce the number of wintering deer. Cattle are also contributing to the problem and a reduction in winter grazing should be considered. Spring use by livestock would promote shrub growth by impacting grass production, but if there are no cool season grasses available, then they will severely impact the sagebrush. The presence of several annuals and increaser species validates the continued downward trend in plant composition and succession. The high amount of bare soil, presence of active gullies, soil movement, and wind erosion indicate a continuing downward soil trend. However, it does not appear severe or unusual for such a sandy soil.

1992 TREND ASSESSMENT

This has been an area that historically has been heavily utilized by both cattle and deer. Trend for soil appears stable with a decline in litter cover somewhat compensated by a reduction in percent bare ground. The browse trend is down. The two key species, Wyoming big sagebrush and winterfat have notable downward trends. Sagebrush density shows a slight increase which is more reflective of the much larger sample size than any change in their actual population. What should be understood is that the proportion of the plants that are considered to have poor vigor have increased from 36% up to 61% and that the proportion of the population that are decadent has also risen from 47% to 81%. To further compound the problem, biotic potential (proportion of seedlings to the population) is less than 1% and the proportion of the young in the population is 18%. These last two values are low, but in 1986 there were no seedlings or young. Winterfat makes up less than 5% of the browse cover and the only real positive aspect of this small population is that percent decadency has gone down from 64% to 28%. The trend for the grasses is slightly up with a slight increase in nested frequency values. The trend for forbs is down, but they are relatively uncommon and only make up 1% of the herbaceous understory cover. The overall trend for the herbaceous understory would be stable, but still very poor condition and poor site potential.

TREND ASSESSMENT

soil - stable

browse - down

herbaceous understory - stable, but poor condition

1999 TREND ASSESSMENT

Trend for soil appears stable with similar ground cover characteristics compared to 1992. Trend for the key browse species, Wyoming big sagebrush is down due to a 3 fold decline in population density, continued

heavy use, and a continuing increase in percent decadence from 81% to 91%. The other preferred shrub, winterfat, is also heavily hedged. It has declined in density but shows improved vigor and lower percent decadence. Trend for the herbaceous understory is down. Cheatgrass has increased dramatically and now dominates the site by providing 88% of the grass cover and 87% of the herbaceous cover. It was present on the site in 1992, but in low numbers. It had a quadrat frequency of only 11% and a cover value of 2%. In 1999, cheatgrass quadrat frequency increased to 97% with a cover value of almost 27%. Nested frequency of perennial grasses declined since 1992, and frequency of the most abundant perennial, blue grama, declined significantly. The only perennial grass that did not decline is needle-and-thread grass. The decline of blue grama, a warm season grass, could indicate dry summers in this area since 1992. Forbs are still an insignificant contributor of cover.

TREND ASSESSMENT

soil - stable, but poor

browse - down and in very poor condition

herbaceous understory - down and now dominated by cheatgrass

HERBACEOUS TRENDS --

Herd unit 14 , Study no: 23

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'92	'99	'86	'92	'99	'92	'99
G	<i>Bouteloua gracilis</i>	_b 141	_c 192	_a 58	54	62	27	18.76	1.20
G	<i>Bromus tectorum</i> (a)	-	_a 27	_b 336	-	11	97	1.95	26.46
G	<i>Oryzopsis hymenoides</i>	_a -	_b 7	_{ab} 2	-	3	2	.21	.03
G	<i>Sitanion hystrix</i>	_a 42	_b 96	_a 48	19	46	24	1.10	.46
G	<i>Sporobolus cryptandrus</i>	_b 95	_b 92	20	37	32	9	4.32	.32
G	<i>Stipa comata</i>	67	54	74	29	25	35	1.50	1.57
G	<i>Vulpia octoflora</i> (a)	-	_b 21	_a 5	-	11	3	.10	.01
Total for Annual Grasses		0	48	341	0	22	100	2.06	26.47
Total for Perennial Grasses		345	441	202	139	168	97	25.90	3.60
Total for Grasses		345	489	543	139	190	197	27.97	30.07
F	<i>Astragalus mollissimus</i>	9	18	12	4	8	7	.06	.06
F	<i>Calochortus nuttallii</i>	-	1	-	-	1	-	.00	-
F	<i>Chenopodium</i> spp. (a)	-	_b 11	_a -	-	5	-	.03	-
F	<i>Descurainia pinnata</i> (a)	-	-	1	-	-	1	-	.00
F	<i>Eriogonum cernuum</i> (a)	-	4	-	-	2	-	.01	-
F	<i>Erigeron pumilus</i>	_b 35	_a 7	_a 2	14	3	2	.06	.06
F	<i>Gayophytum ramosissimum</i> (a)	-	_a -	_b 5	-	-	3	-	.01
F	<i>Machaeranthera canescens</i>	12	8	7	6	4	4	.07	.09
F	<i>Phlox austromontana</i>	-	3	-	-	2	-	.03	-
F	<i>Phlox longifolia</i>	-	-	2	-	-	1	-	.00
F	<i>Plantago patagonica</i> (a)	-	18	28	-	7	14	.03	.16
F	<i>Sphaeralcea coccinea</i>	2	-	-	1	-	-	-	-

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'92	'99	'86	'92	'99	'02	'09
	Total for Annual Forbs	0	33	34	0	14	18	0.07	0.18
	Total for Perennial Forbs	58	37	23	25	18	14	0.24	0.21
	Total for Forbs	58	70	57	25	32	32	0.31	0.40

Values with different subscript letters are significantly different at $\alpha = 0.10$

BROWSE TRENDS --

Herd unit 14 , Study no: 23

T y p e	Species	Strip Frequency		Average Cover %	
		'02	'09	'02	'09
B	Artemisia tridentata wyomingensis	60	38	4.69	2.00
B	Atriplex canescens	3	2	.00	.15
B	Ceratoides lanata	10	7	.30	.53
B	Chrysothamnus viscidiflorus stenophyllus	47	51	3.82	4.67
B	Gutierrezia sarothrae	0	1	-	-
B	Juniperus osteosperma	0	1	-	.03
B	Opuntia spp.	6	4	.15	.15
B	Pinus edulis	0	2	.85	.63
B	Sclerocactus whipplei	5	8	.04	.12
	Total for Browse	131	114	9.87	8.31

BASIC COVER --

Herd unit 14 , Study no: 23

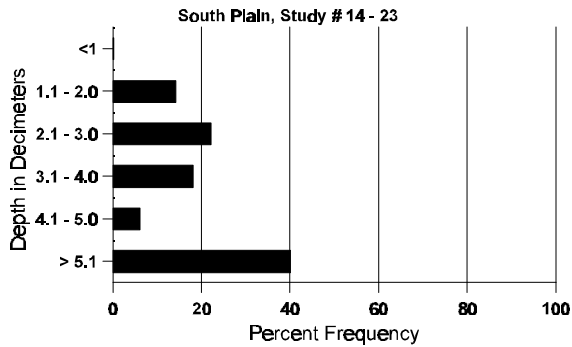
Cover Type	Nested Frequency		Average Cover %		
	'02	'09	'86	'92	'99
Vegetation	309	351	9.50	39.09	37.93
Rock	8	18	0	1.76	.06
Pavement	41	69	0	0	.65
Litter	244	345	52.75	30.99	34.20
Cryptogams	80	34	0	.68	.33
Bare Ground	306	305	37.75	33.59	33.42

SOIL ANALYSIS DATA --

Herd Unit 14, Study # 23, Study Name: South Plain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
19.8	70.8 (16.7)	7.6	60.0	23.4	16.6	0.8	5.3	67.2	.4

Stoniness Index



PELLET GROUP DATA --

Herd unit 14 , Study no: 23

Type	Quadrat Frequency		Pellet Transect Days Use/Acre (ha)
	02	09	09
Rabbit	25	28	N/A
Deer	47	47	76 (188)
Cattle	1	6	13 (32)

BROWSE CHARACTERISTICS --

Herd unit 14 , Study no: 23

A Y G R E		Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total			
		1	2	3	4	5	6	7	8	9	1	2	3	4							
Artemisia tridentata wyomingensis																					
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0				
	92	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1				
	99	6	-	1	-	-	-	-	-	-	7	-	-	-	140		7				
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0				
	92	1	15	-	7	8	-	-	-	-	31	-	-	-	620		31				
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1				
M	86	-	-	24	-	-	-	-	-	-	19	-	1	4	1600	19	23				
	92	-	-	3	-	-	-	-	-	-	3	-	-	-	60	-	-				
	99	-	2	2	-	-	-	-	-	-	4	-	-	-	80	18	23				
D	86	2	-	19	-	-	-	-	-	-	10	-	-	11	1400		21				
	92	-	5	128	-	5	4	-	-	-	35	-	87	20	2840		142				
	99	6	11	22	-	-	14	-	-	-	23	-	4	26	1060		53				
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0				
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0				
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	1120		56				
% Plants Showing																					
		Moderate Use				Heavy Use				Poor Vigor				%Change							
		'86				00%				96%				36%				+15%			
		'92				19%				77%				61%				-67%			
		'99				22%				66%				52%							
Total Plants/Acre (excluding Dead & Seedlings)																					
												'86	3000	Dec:	47%						
												'92	3520		81%						
												'99	1160		91%						

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Atriplex canescens																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	92	1	2	-	-	-	-	-	-	-	-	3	-	-	60	-	-	3
	99	2	-	-	-	-	-	-	-	-	-	2	-	-	40	39	58	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'92		67%			00%			00%			-33%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'92	60		-			
												'99	40		-			
Ceratoides lanata																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	-	-	-	-	-	-	-	-	-	1	-	-	20			1
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	92	1	6	9	5	-	-	-	-	-	-	21	-	-	420			21
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	5	-	-	-	-	-	-	-	-	5	-	-	333	11	8	5
	92	-	1	-	-	1	-	-	-	-	-	2	-	-	40	-	-	2
	99	-	-	17	-	-	2	-	-	-	-	19	-	-	380	16	12	19
D	86	-	-	9	-	-	-	-	-	-	-	9	-	-	600			9
	92	1	-	8	-	-	-	-	-	-	-	5	-	4	180			9
	99	-	-	1	-	-	-	-	-	-	-	-	-	-	20			1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		36%			64%			00%			-31%							
'92		25%			53%			13%			-38%							
'99		00%			100%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	933	Dec:	64%			
												'92	640		28%			
												'99	400		5%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus stenophyllus																		
S	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8	
	92	21	7	-	8	-	-	-	-	-	27	-	9	-	720		36	
	99	4	-	-	-	-	-	-	-	-	4	-	-	-	80		4	
M	86	4	1	1	-	-	-	-	-	-	5	-	1	-	400	12	14	
	92	57	3	-	-	-	-	-	-	-	59	-	1	-	1200	-	-	
	99	64	9	-	1	-	-	-	-	-	74	-	-	-	1480	18	28	
D	86	15	5	1	-	-	-	-	-	-	14	-	5	2	1400		21	
	92	19	1	-	-	-	-	-	-	-	5	-	15	-	400		20	
	99	13	3	2	-	-	-	-	-	-	15	-	-	3	360		18	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		17%			06%			23%			- 1%							
'92		09%			00%			22%			-17%							
'99		13%			02%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	2333	Dec:	60%			
												'92	2320		17%			
												'99	1920		19%			
Gutierrezia sarothrae																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	99	-	1	-	-	-	-	-	-	-	1	-	-	-	20	9	10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'92		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'92	0		-			
												'99	20		-			
Juniperus osteosperma																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'92		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'92	0		-			
												'99	20		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	3	-	-	-	-	-	-	-	-	-	3	-	-	60		3	
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20		1	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	9	-	-	1	-	-	-	-	-	-	7	-	3	200		10	
	99	1	-	-	-	-	-	-	-	-	-	1	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	3	-	-	-	-	-	-	-	-	-	3	-	-	60	6 13	3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'92		00%			00%			30%			-60%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'92	200		-			
												'99	80		-			
Pinus edulis																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	92	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	2	-	-	-	-	-	-	-	-	-	2	-	-	40	-	2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'92		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'92	0		-			
												'99	40		-			
Sclerocactus whipplei																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	92	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	92	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	2	
	99	8	-	-	-	-	-	-	-	-	8	-	-	-	160	4 6	8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'92		00%			00%			00%			+38%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	0	Dec:	-			
												'92	100		-			
												'99	160		-			